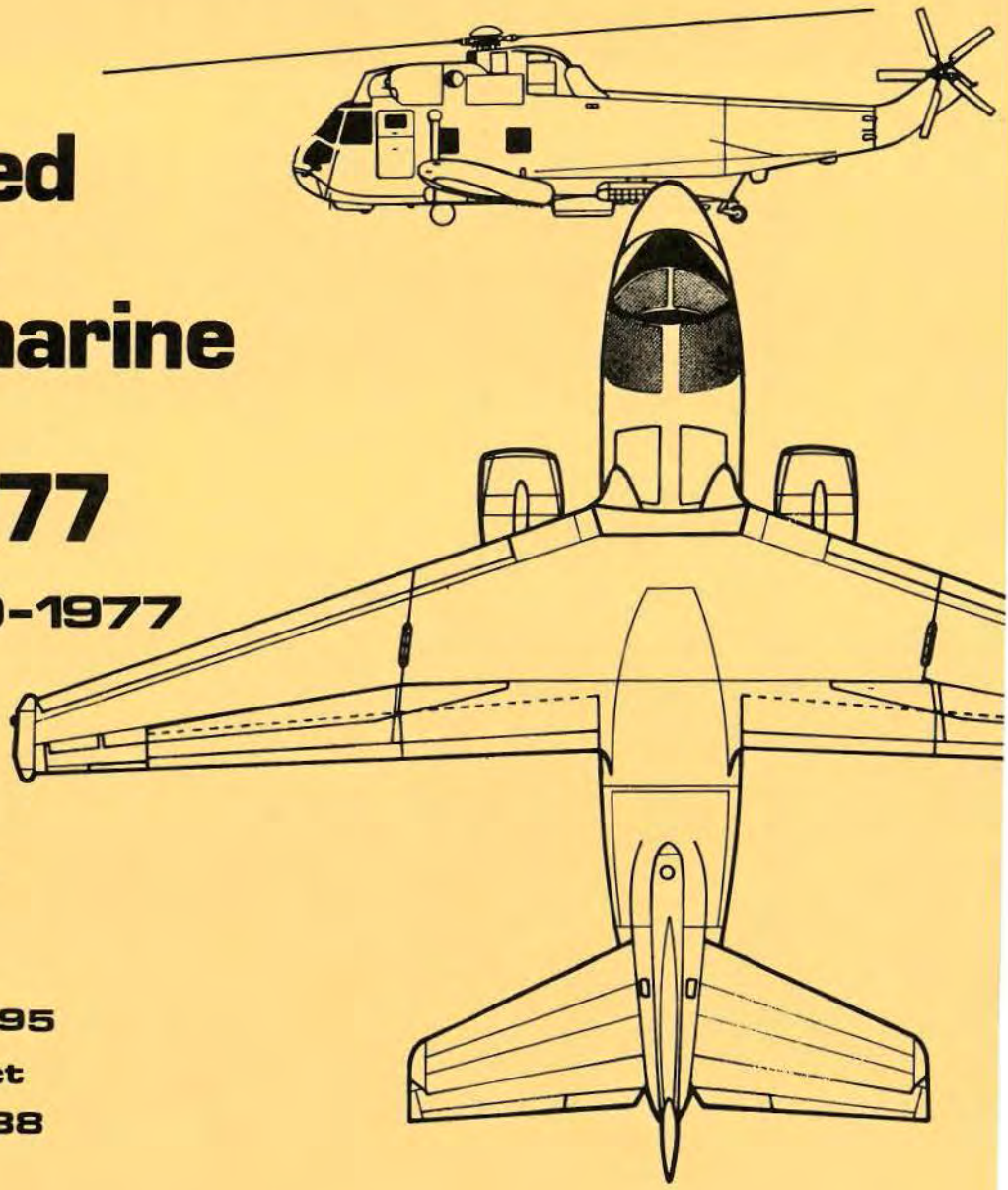
Sea-Based Airborne Antisubmarine Warfare 1940-1977

Volume II 1960-1977



28 April 1978

Prepared For Op-095
Under ONR Contract
N00014-77-C-0338

Second Edition

RFC

R. F. CROSS ASSOCIATES, LTD.

111 SOUTH FAIRFAX STREET • ALEXANDRIA, VIRGINIA 22314 • 703-548-4034

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FOREWORD

This is the second volume of a report prepared for Op-095 under ONR Contract N00014-77-C-0338. It presents a summary of the development of Sea-Based Airborne Anti-submarine Warfare during the 1960 to 1977 time period based primarily on official Navy records available in the Washington area. The objective of this study is to provide a management oriented chronology of events in the development of Sea-based Airborne ASW. Consideration is given to policy, threat, technology, operations, organization and finances, generally as this information was available through the SECRET level of classification.

Research for this study has been based largely on official documents and correspondence, many of which were originally highly classified. In general, the Navy's ASW records for the period from 1960 on were found to be incomplete due in part to the disestablishment of many of the key commands. In addition the sensitive nature of much of the material has made destruction easier than retention. The resulting chronology, however, attempts to place proper emphasis on the important factors affecting the development of Sea-Based Airborne ASW. The main body of text for each chapter lets the participants, primarily from within the Navy itself, speak for themselves and their organizations as the chronology unfolds during this fifteen-year period.

Each of the chronologically oriented chapters includes a précis at the beginning and a summary at the end, the latter under the heading "What It All Means." Thus, each chapter reviews what is to be covered, develops the material in the body of the chapter, and finally summarizes what has been explored. In addition, there is a graphically oriented section at the beginning of each chapter which presents the threat and the U.S. hardware oriented response. Included also is a typical overall Navy ASW organization for each period as well as the fiscal budgets for the time covered. All of these are to a common scale between chapters so that trends may be easily observed.

Material of importance which has been included in the text is extensively referenced. Primary research sources for this second volume include the Operational Archives, Naval History Division (Op-09BH); the Office of Naval Aviation History; the National Security Industrial Association's Annual Proceedings; and a limited selection of OPNAV files, primarily in the organizational areas. In addition, the Naval Institute at Annapolis provided graphic material from their extensive files.

On an individual basis, valuable assistance and contributions were made by Captains Oakley Osborn and William Whaley, Commander Peter T. Smith, Lieutenant Commander David Sullivan, and Chief L. G. Milstead of the Op-95 Staff. This selective work would have been far less complete without their assistance, often on extremely short notice.

The extensive research and much of the early writing this study required was ably performed by Linda J. Bombick, supported in a number of specialized areas by Dr. Charles S. Nicewarner and Kenneth L. Knight, Jr. The report assembly was the responsibility of Arthur L. Smith, Jr., who proved an extremely competent jack-of-all trades, assisted by Alice D. Smith on the vital Wang word processor. The many security problems, some never before addressed by anyone, were tirelessly surmounted by Kathleen W. Mereness. For this volume, professional expertise and editing were provided by a number of consultants, including retired Captains John W. King and William D. Taylor.

Illustrations

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SUMMARY

(U) The early 1960s saw sea-based airborne antisubmarine warfare reach its peak with the creation of nine ASW carrier groups assigned to the Atlantic and Pacific fleets. In the latter ocean, these deployed regularly to WESTPAC while task group ALFA continued to concentrate on the development of new Hunter-Killer Group techniques in the Atlantic. The CVSs during this period were all recently modified *Essex* class 27A conversions which during the early sixties were further modified to handle their new role in antisubmarine warfare. Their CVS air groups now were receiving the latest model of the S-2 Tracker, the S-2E, with its advanced JEZEBEL search and JULIE localization sonobuoy systems. In addition the carriers' other major new airborne ASW system was the longer endurance all weather SH-3A Sea King with its AQS-13 deep dipping sonar. All critical ASW activities were assessed aboard the carrier, this leading during the early sixties to the development and growth of the Antisubmarine Contact Analysis Center (ASCAC), predecessor to the CV-TSC aboard the CVs in the seventies.

(U) The Soviets showed increasing interest during this period in long range naval air which, operating independently or with the new cruise missile submarine classes, meant the creation of a growing air threat to the Navy's carrier forces. The Navy's growing concern resulted in the addition to the CVS air group of four A-4Bs, the only relatively high performance aircraft available to these carriers. This limited capability contributed to the attractiveness of the CV concept of the seventies which in all modes of operation preserved two squadrons of interceptors on each carrier.

(U) Also, during the sixties the Soviet Navy initiated a steady series of advanced new submarine designs, the most important of which during the early part of the decade were the first generation nuclear powered H-E-N classes (Hotel SSBN, Echo II SSGN, and November SSN), all operational by the mid-sixties. The H-E-Ns were followed in the late sixties by the second generation C-V-Y classes (Charlie SSGN, Victor SSN, and Yankee SSBN), these showing a marked improvement in hydrodynamics and weapons characteristics over their predecessors. These classes as well as the new DELTAs, ALFAs and TANGOs constituted the main Soviet threat on into the seventies, for both strategic and general war considerations.

(U) This increasingly wide ranging Soviet submarine force required worldwide accounting, and as a result the continental SOSUS system continued to expand during this period, living up to its promise, and then some, as a long range passive surveillance system. Its success led to the forward area concept with arrays located in areas of the world which would permit monitoring of Soviet training and trials operations. This resulted in turn in the creation of new installations in the central and northern Pacific and in the eastern and northern Atlantic, which provided an impressive insight into Soviet submarine predeployment activities. The data this growing system provided, coupled with HFDF and other intelligence sources, were combined with the new long range land-based P-3 Orion to provide the Navy's most effective and wide ranging contact investigation team, effectively relegating the Hunter-Killer Task Group built around the CVS to task force protection.

(U) The P-3s, SOSUS, and the ASW carriers required command and control however, and this led to a progressive strengthening of the ASW organizations in the Atlantic and Pacific Fleets as well as the continued emphasis on dedicated ASW elements in the deployed SIXTH and SEVENTH Fleets. Thus the ASWFORLANT and ASWFORPAC commands moved steadily from an advisory and training role to one heavily involved in intelligence assessment and fleet ASW operations, as well as becoming strong advocates of new ASW systems and critics of ASW deficiencies such as torpedo performance. The annual reports of these two commands during the last half of the sixties were strong statements on the technical and operational status of the Navy in ASW.

(U) The Navy's move to put unmanned helicopter weapon delivery systems on its fleet escorts, started with

such high expectations during the late fifties, ran into continued development delays during the early sixties. As a result this system using DASH helicopters was replaced some five years later by the LAMPS helicopter concept which was manned and multimission in nature. Most importantly, a proven helicopter was to be selected for the interim aircraft in the early seventies, it being the Navy's UH-2 Seasprite utility vehicle, modified to the ASW role as the SH-2F. LAMPS III, the ultimate shipboard helicopter, grew in mission range and crew size to the point where it could share the Army's UTTAS airframe. It, however, would not become operational until the early 1980s, Congress willing.

(U) The Navy's dipping sonar helicopter, the SH-3 series for nearly all of this period, proved progressively disappointing in operation both from a maintenance and operational point of view as the Soviet submarine performance and experience increased and as the helicopter grew older. The 1970s therefore saw the SH-3 updates moving toward multisensor capability, this including sonobuoys, MAD, and radar, as well as EW equipment. The SH-3H, created in 1973, represented the ultimate Sea King conversion, proving however, to be overweight and with limited endurance.

(U) The early seventies saw the final disappearance of the antisubmarine carriers as their age and maintenance problems combined with severe fiscal restraints to force the Navy, under the firm hand of DOD, to reduce its total carrier force. To replace this missing capability the Navy moved simultaneously in two alternate directions. After successful tests in the Atlantic and Mediterranean, the postwar CVAs were modified during the seventies to include the newly created variable TACAIR-ASW air wing, the composition of which varied with the mission at hand. Despite a host of initial problems this concept proved workable, and all CVAs were redesignated as CVs by 1976. In 1970, at the same time the CV concept was created, the Navy evolved the Sea Control Ship, a 15,000 ton platform supporting sufficient ASW helicopters to establish continuous sonobuoy barriers for several days. These single screw ships were to relieve the attack carriers of convoy responsibility. This concept foundered because of the lack of an adequate air vehicle which in turn could verify the ship's characteristics. The primary outcome of the SCS program was the expansion of the Navy's VTOL projects for future new construction after congressional refusal to fund the SCS itself.

(U) After considerable review by OSD, a new fixed wing ASW program was initiated in the late sixties. This was the S-3A Viking, a carrier based smaller counterpart of the successful land-based P-3 Orion. This aircraft with its digitally integrated electronics and advanced sonobuoy systems represented the ultimate in sea-based airborne ASW technology for the seventies, it reaching the CVs for operational deployment in early 1975.

(U) There were four major conflicts or crises of note during the fifteen year period covered by this second volume. These were the Cuban Missile Crisis of October 1962 which emphasized the growth and importance of ASW air as an initial detection system; the Vietnam War which hastened the demise of the ASW carrier; the Six Day Arab-Israeli War of June 1967 which forced recognition of surface ship vulnerability to the missile and submarine threat; and finally the Yom Kippur War of October 1973. The last two conflicts served to stress the importance of the Navy's CV and LAMPS programs in providing fleet antimissile and antisubmarine defense while pointing up the limitations of SOSUS and the promise of the towed array surveillance systems. Both the Soviet Navy and that of the U.S. were now in nearly constant contact, each using the other for training and surveillance exercises. The ASW activities of both navies were a focal point of these activities.

(U) Chapter Five covers the growth of the CVS concept, the problems encountered with DASH and the strengthening of the Navy's ASW organizations concurrent with expansion of SOSUS. Chapter Six outlines a period of numerous studies, sponsored by DOD and the Navy, which found the CVS concept called into question, the DASH system discarded in favor of LAMPS and new air capable surface escort programs along with the S-3A ASW aircraft development initiated. Chapter Seven chronicles the first half of the seventies; the demise of the CVS and the Fleet ASW organizations; the creation of the CV concept and the operational employment of LAMPS by the fleet escorts. This chapter essentially concludes the detailed selective chronological development of seabased airborne antisubmarine warfare with events reported through 1975.

CHAPTER V

The CVS Years

1961-1965

(U) *The first half of the sixties saw the CVS concept rise to its peak as the Navy's primary commitment to sea-based airborne antisubmarine warfare. A total of nine CVSs were involved on both coasts, they acquiring the most recent version of the Tracker aircraft, the JULIE and JEZEBEL capable S-2E, as well as the new and much improved all weather SH-3A Sea King helicopter with its AQS-13 dipping sonar. DASH, the destroyer unmanned helicopter long range ASW weapon delivery system, would encounter problems which would delay its full fleet introduction during this period. The Navy's ASW organizations, newly separated as identifiable entities in both fleets, grew stronger while after several intermediate, less ambitious alternatives, the Navy created its most powerful "Czar" of ASW in Washington - Op-95, Director of Antisubmarine Warfare, first headed by Vice Admiral Charles Martell. The threat expanded as the Soviets went operational with their initial ballistic and cruise missile submarines built for the purpose as well as their first nuclear powered attack boats. SOSUS backed up by HFDF continued to expand as it showed major promise in keeping track of the increasingly well-organized, world-wide Soviet submarine activities. The Cuban missile crisis offered the Navy its first real chance to test modern day ASW against Soviet submarine technology, and the results were encouraging.*

THE THREAT 1961-1965

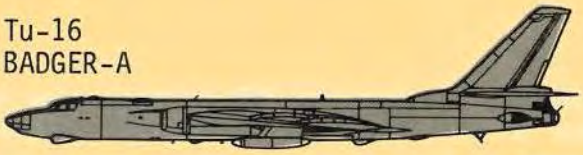
Tu-95
BEAR-A

Cruise Speed	410 kts
Gross Weight	340,000 lbs
Unrefueled Cruise Radius	4,050 nmi

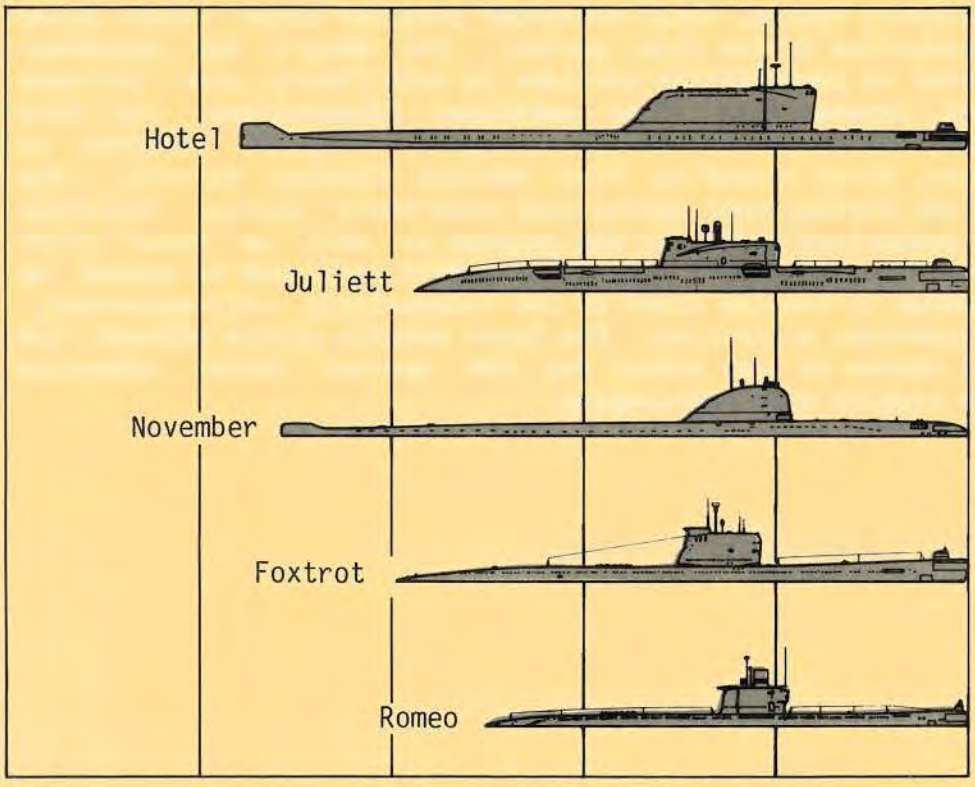
M-4
BISON-B

Cruise Speed	450 kts
Gross Weight	350,000 lbs
Range	6,075 nmi

Tu-16
BADGER-A



Cruise Speed	417 kts
Gross Weight	150,000 lbs
Range	3,450 nmi

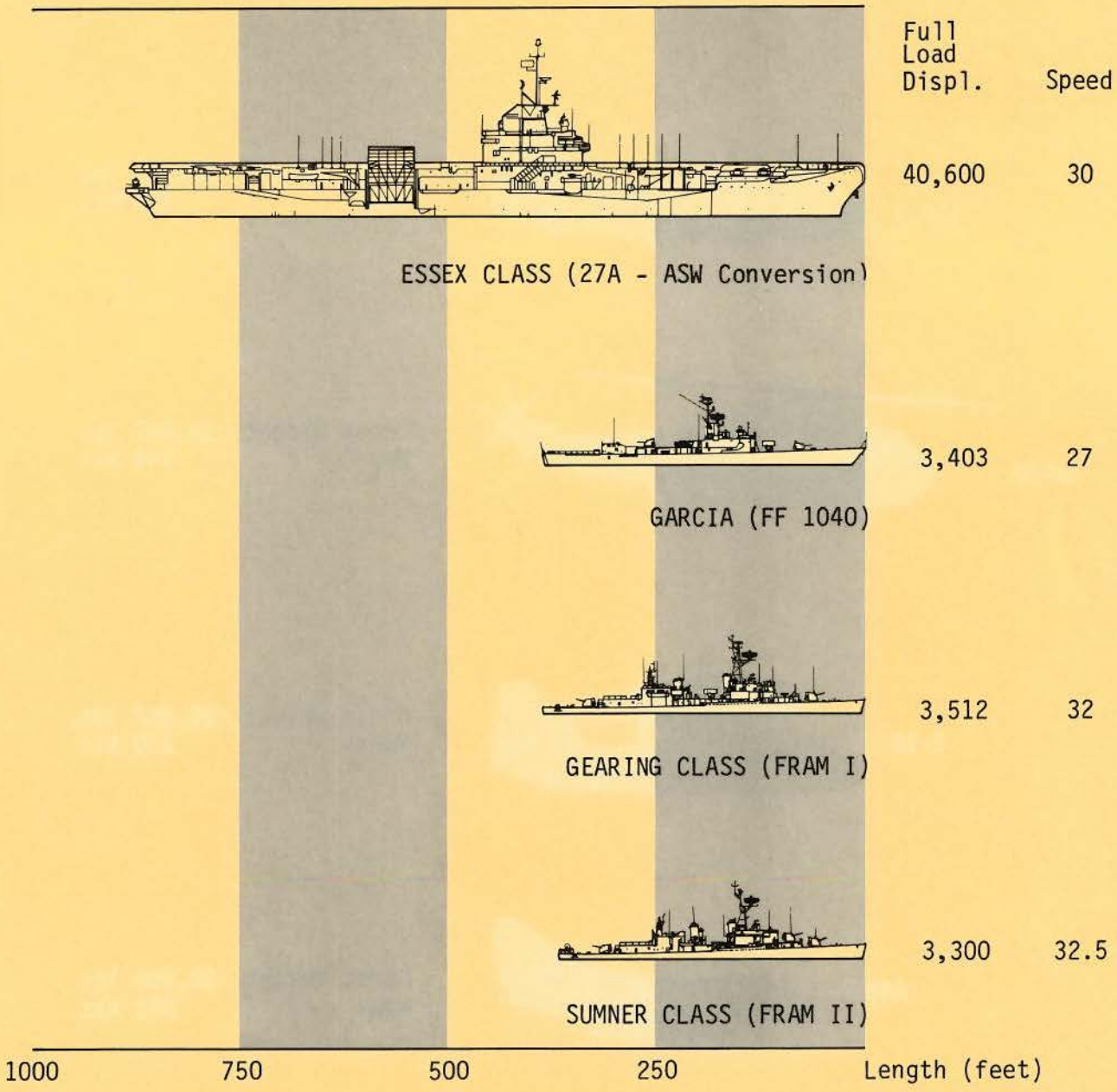


	Displ.	Speed
Hotel	4,900	20
	5,900	23
Juliett	2,800	19
	3,550	14
November	4,500	20
	5,400	b(1)
Foxtrot	1,950	18.7
	2,400	16.7
Romeo	1,400	16.8
	1,800	12.5

S-B|A
ASW

The CVS Years

SEA-BASED AIRBORNE ANTISUBMARINE SHIPS 1961-1965

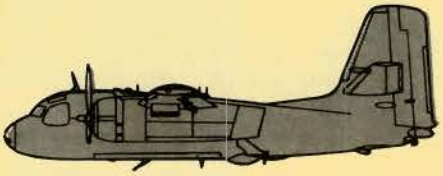


TYPICAL MERCHANT SHIPS

Average of New Construction - DWT Tons

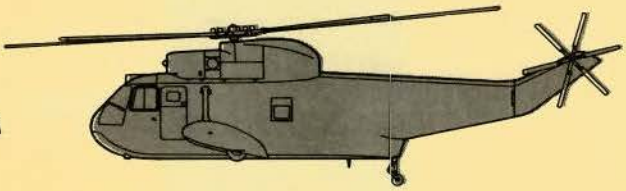
SEA-BASED AIRBORNE ANTISUBMARINE AIR 1961-1965

S2F-3



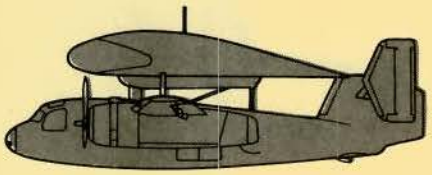
Gross Weight 26,150 lbs
Vmax 220 kts

SH-3A



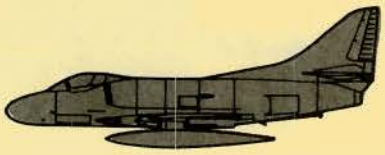
Gross Weight 18,897 lbs
Vmax 144 kts

E-1B



Gross Weight 26,867 lbs
Vmax 220 kts

A4B



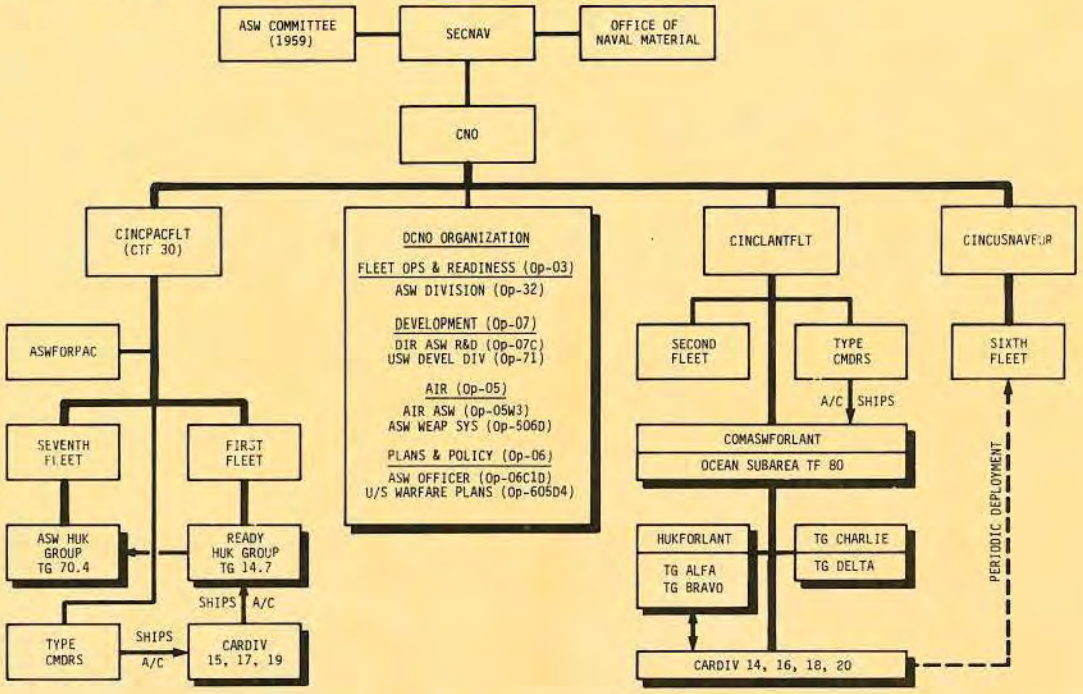
Gross Weight 22,500 lbs
Vmax 583 kts

QH-50C

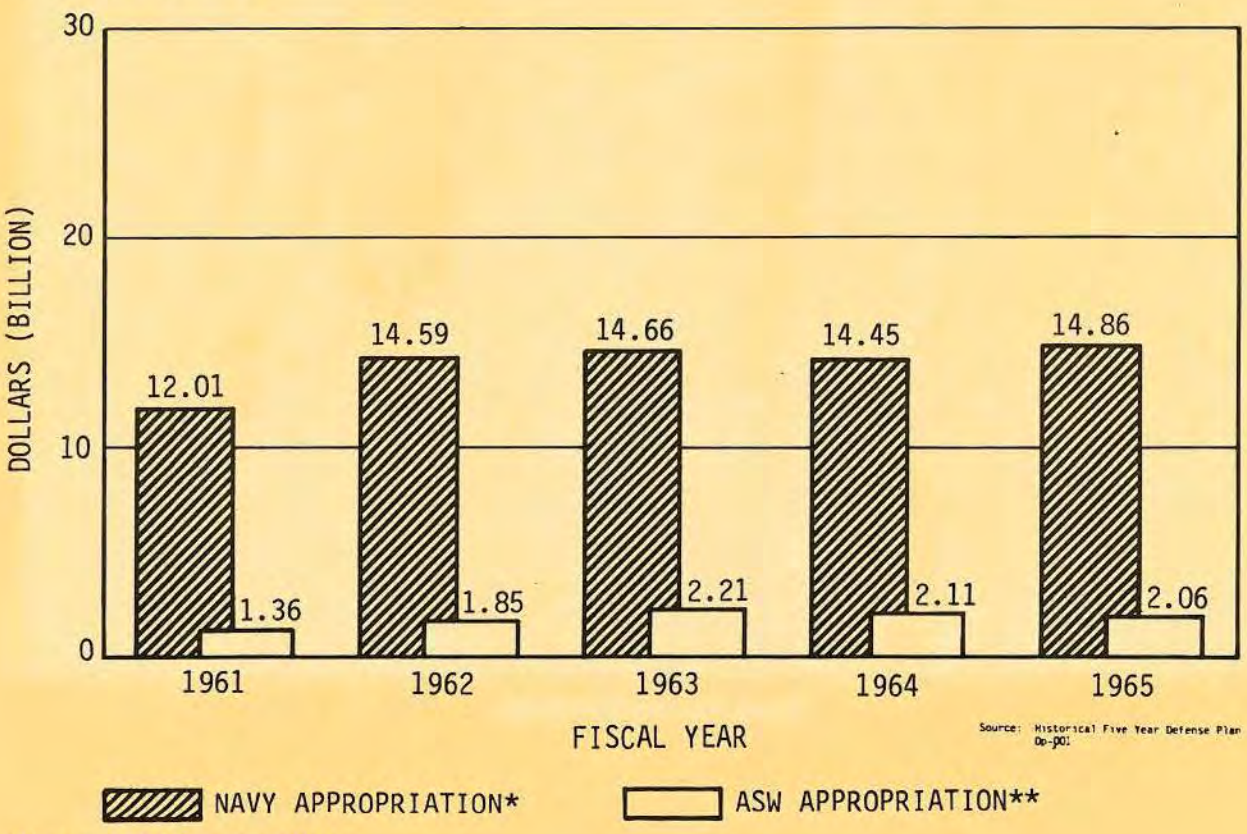
Gross Weight 2,296 lbs
Vmax 78 kts

The CVS Years

AIR ASW ORIENTED ORGANIZATION 1963

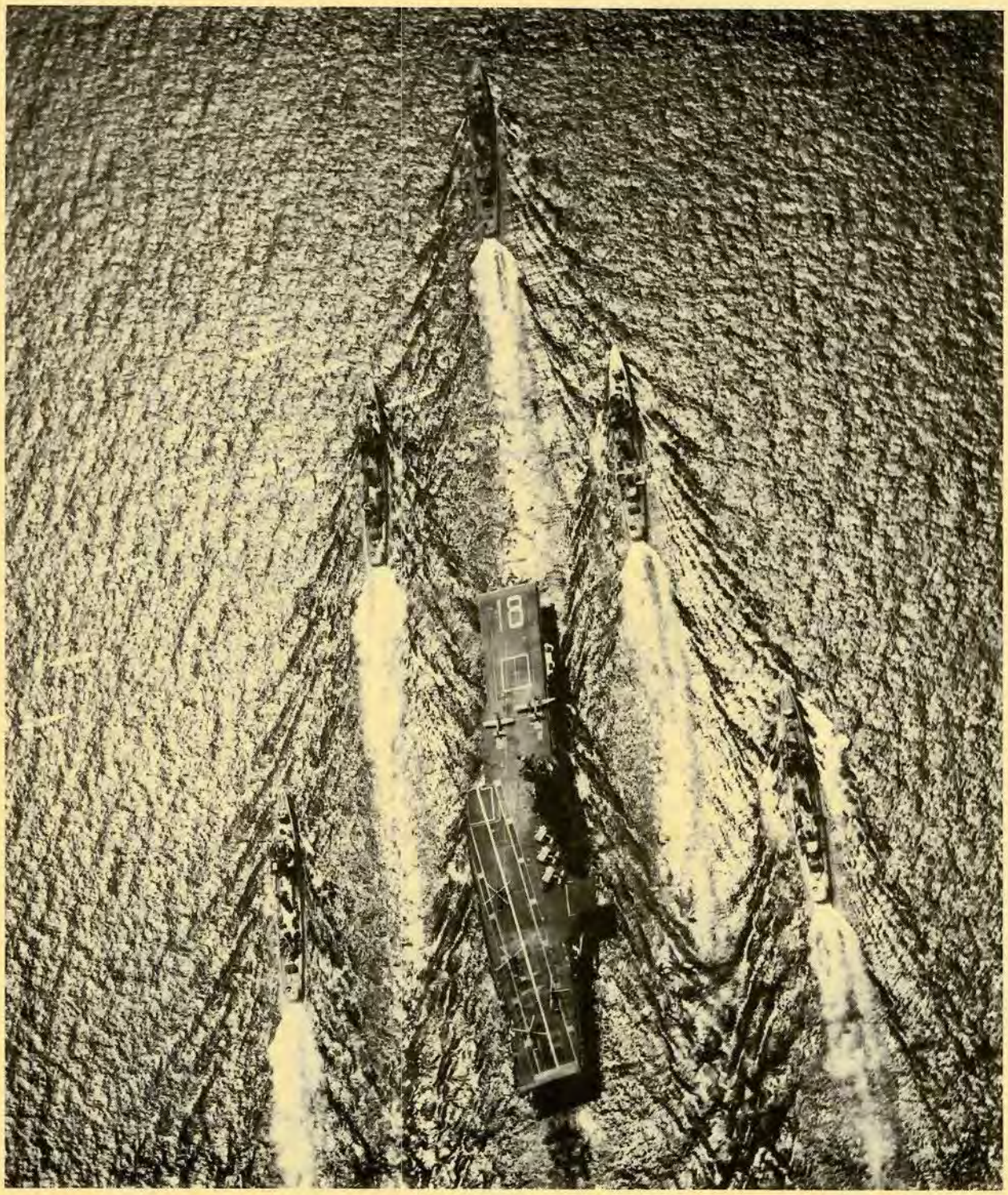


FINANCIAL SUMMARY



* Includes total Navy appropriation.

** Includes only aircraft, weapons, shipbuilding and conversion, and other procurement.



U.S. Navy

Task Force BRAVO

Chapter V

The CVS Years

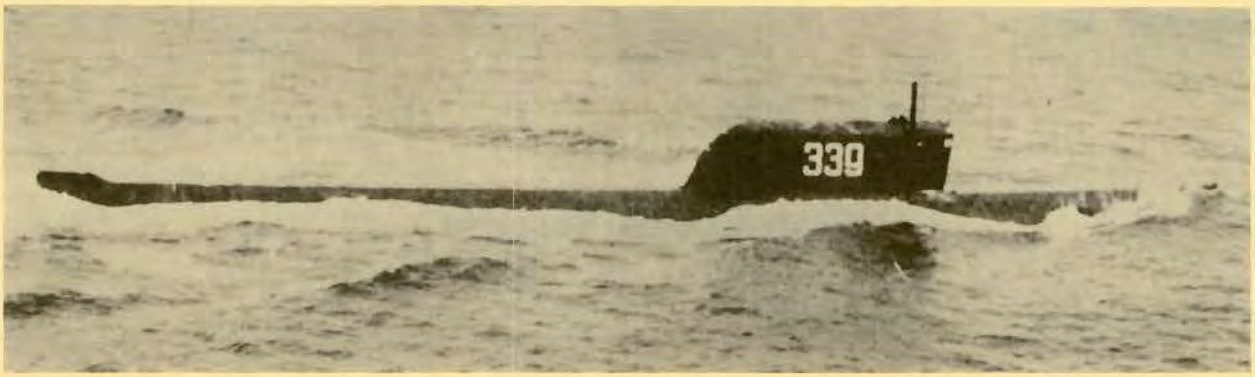
Change in the ASW Environment

(U) The early sixties were years of refinement for sea-based airborne antisubmarine warfare as the Navy moved to meet the growing nuclear-powered, missile-tipped Soviet submarine threat. Increasingly these changes were technologically oriented, forcing basic shifts in the techniques of naval warfare itself. The Chief of Naval Operations, Admiral Arleigh Burke, summarized one aspect of this in January 1960 when emphasizing the need for conventional forces, including those required for ASW:

Admiral Burke, 1960

> (U) It is no longer appropriate to view the ASW problem within a World War II setting. This was a legitimate approach prior to the introduction of weapons of mass destruction. Today, with both the Free World and the Soviets possessing the capability to destroy each other by the use of nuclear weapons, general war is becoming more and more unlikely, as a deliberate act by a rational leadership. It is necessary to provide some assurance, however, against irrationality and miscalculation. It is also true that too great (a) reliance on the unlikeliness of general war may result in weaknesses which tempt attack by an enemy more willing to accept hardship toward ultimate goals. The need for assuring that an enemy cannot ultimately profit from all-out war will thus remain to some degree.[1]

(U) Thus limited conflicts and antisubmarine warfare as part of such confrontations were increasing possibilities. Three days later, before Congress, Admiral Burke summarized the Navy's appreciation of antisubmarine warfare:



U.S. Navy

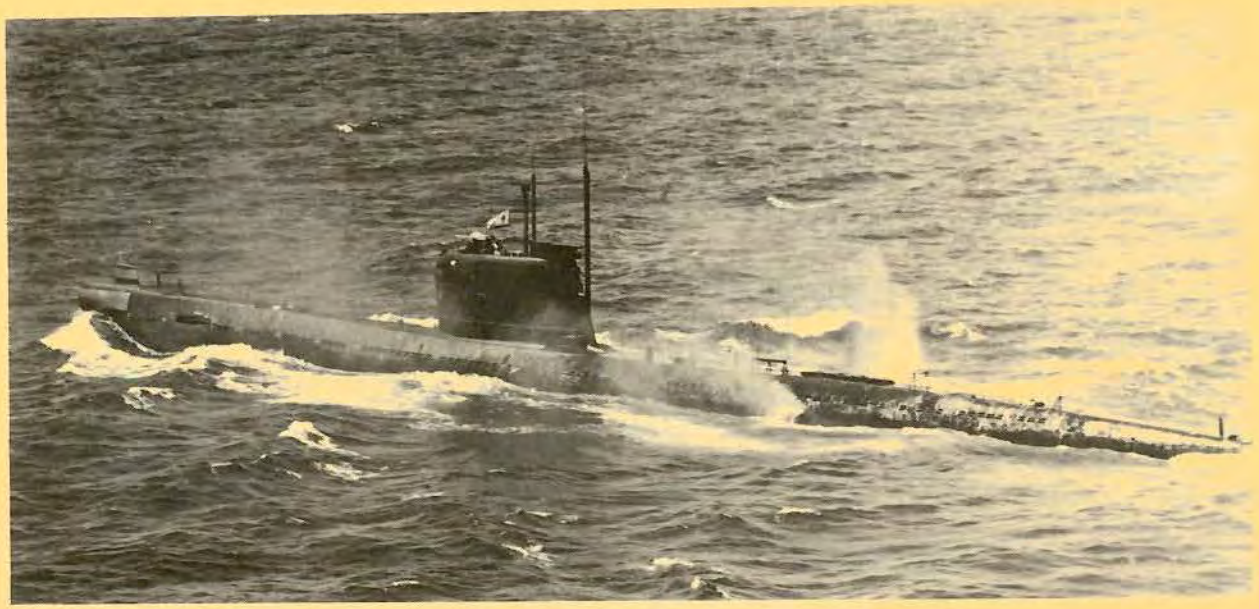
(U) Soviet Hotel class ballistic missile submarine.

U.S. Navy

(U) Juliett class entering the Mediterranean. Note the blast deflectors for the SS-N-3A missiles.

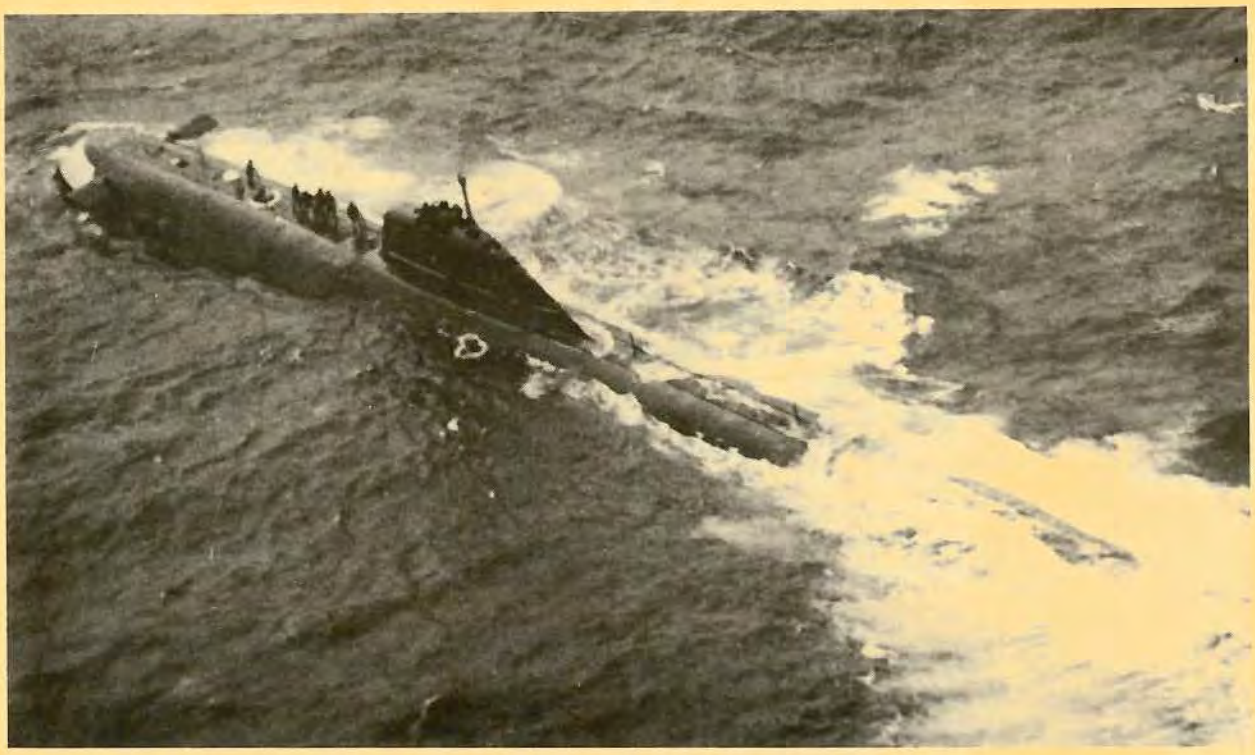
U.S. Navy

(U) An Echo II with eight SS-N-3A missiles at speed. Used by the Soviets in both the Atlantic and Pacific in the anti-combatant ship role.



U.S. Navy

(U) A Foxtrot, the Soviets' most prominent conventionally powered attack submarine from the early sixties on. The Indian Navy operates several.



U.S. Navy

(U) A November in trouble in the North Atlantic. Russia's first class of nuclear powered attack submarine.

ASW Progress, Threat Progress

> (U) . . . The Navy's concern over the ASW problem is grave. Within its resources, the Navy is devoting maximum funds and effort to develop new means and improve current techniques for solving this problem. There has been a marked improvement in our ASW capability, and even more significant progress will be attained in 1960 and 1961 as new equipment is installed. However, the submarine advances have been even more rapid, and we are not yet able to feel confident in our ability to meet the threat--especially that posed by the anticipated sub-launched ballistic missiles. We must continue intense efforts to increase our ability to meet the various degrees and types of submarine warfare with our ASW forces.[2]

The Developing Soviet Submarine Threat

(U) The Soviet Navy moved rapidly during the early sixties to bring out its second generation of submarines. As had been anticipated, many of these were nuclear powered and, depending on the class, carried either ballistic or cruise missiles.

Ballistic Missile Progress

(U) The 1959 Golf class of ballistic missile submarines was now joined by the nuclear powered Hotel class, each of which carried three SS-N-4 ballistic missiles, these first appearing in 1961. The ballistic missile boats were almost immediately followed by three new, much larger cruise missile submarine classes designed around the SS-N-3A missile. These all were much larger than the earlier Whiskey cruise missile conversions. Included in this group was the conventionally powered Juliett class of 1963, each of which carried four horizontally stowed SS-N-3A cruise missiles in two pairs. The similarly configured but nuclear powered Echo I also became operational around the same time, this class having six SS-N-3A missiles in three pairs. Only five of the latter were built before the Soviets switched to the larger and more successful eight missile Echo IIs in 1964.

Soviet Cruise Missiles

Soviet Attack Submarines

(U) The new conventionally powered antishipping Soviet submarine classes of this period included the numerous 2,300-ton Foxtrots which were the first to operate in substantial numbers in the western Atlantic during the Cuban Missile Crisis of 1962. In addition, the smaller 1,500-ton Romeos made their appearance in the waters

contiguous to the Soviet Union. These classes became operational in 1960 and 1961 respectively. Finally, the 4,550-ton Novembers, the Russian navy's first operational nuclear powered attack submarine class, began working up at about the same time the U.S. second generation attack submarines of the *Skipjack* class (SSN 585) were commissioning.

U.S. and Soviet Submarine Programs

(U) During the very early sixties, the U.S. Navy introduced not only the hydrodynamically advanced *Skipjack*, but the Navy's smallest nuclear powered ASW submarine, the 2,300-ton prototype *Tullibee* (SSN 597), carrying the first version of the BQQ-2 sonar system. The improvement in passive detection which this represented was incorporated in the larger *Thresher* (SSN 593) class which followed immediately.

Skipjack *and* Tullibee

b(1)

From a strategic point of view, the five Fleet Ballistic Missile submarines of the *George Washington* class (SSBN 598) were followed immediately by the improved *Ethan Allen* (SSBN 608) class. The success of the nationally oriented, strategic deterrent Polaris program led to the first U.S. SSBNs going on patrol by mid-1960. The need for Polaris submarines in the North Atlantic and Mediterranean, where their relatively short range A-1 missiles could be effective, delayed Polaris deployment in the Pacific until the *Daniel Boone* (SSBN 628) made her first patrol in December 1964.

SSBNs

(U) While the United States had terminated its cruise missile submarine construction programs along with the Regulus II missile development, the Soviets elected to continue development in this area. Early Soviet designs were very short range--under then current U.S. intelligence projections. The cruise missile carried by the Juliett and Echo classes, for example, was able to reach only 220 miles, while the range of the SS-N-4 ballistic missiles was a mere 350 nautical miles, this being extended in 1963 with the introduction of the 700 mile SS-N-5. This limitation forced Soviet operation close to the United States, increasing emphasis on the close-in SOSUS shallow water system then under development. In short, Soviet missile technology during this period lagged behind that of the U.S., all Russian missile systems requiring surface launch while the Polaris A-1 missiles, able to reach 1,300 nautical miles, could be fired from a submerged submarine.

Differing Cruise Missile Efforts

U.S. Navy

U.S. Navy

(U) (Above) USS Scamp (SSN 588) of the Skipjack class. Combining nuclear power with the advanced hydrodynamics of the experimental Albacore (AGSS 569), our fastest submarines until the SSN 688 class. (Right) USS Tullibee (SSN 597), at 2,640 tons submerged, the Navy's smallest nuclear powered submarine specifically for ASW.

U.S. Navy

(U) USS Permit (SSN 594), one of a long line of impressive nuclear powered ASW submarines which underwent a progressive series of design improvements.

U.S. Navy

(U) The second of the Navy's first class of 16-missile SSBNs, 22 July 1960.

(U) Along with the Soviet missile developments, there was marked improvement in their submarine propulsion systems as well. In early 1961, Op-312 summarized Soviet nuclear powered submarine progress: (U)

1961 U.S. Navy Assessment

> (U) The Soviets may have completed as many as five nuclear powered submarines, of which three are assigned to operational service in the Northern Fleet. It must be emphasized, however, that positive confirmation of an operational Soviet SSN is lacking.[3]

(U) With regard to the ultimate combination, the nuclear powered ballistic missile submarine, Op-312 reported: (U)

> (U) There is no evidence that the Soviets have as yet completed any nuclear powered ballistic missile submarines but considering their technological capabilities and the potential value of the weapons system, it is estimated that a nuclear submarine/ballistic missile system could be ready for operational use in 1962. Thereafter, in a reasonable construction program, the Soviets could introduce a few such submarines into operational units annually. This system would probably use a 500 to 1,000 nautical mile missile with a 1,000 pound warhead.[4]

(U) Ultimately the Soviet Yankee class, its missile load and range comparable to the early Polaris, would make its initial appearance in 1969. The much more primitive Hotels met Op-312's operational timetable, but not their estimate of range.

Meeting the Russians

(U) During the 1960-1964 period positive submarine contacts in the Atlantic varied between eight (FY 62) and forty-five (FY 65), with the exception of FY 63 when CINCLANTFLT reported 169, the vast majority of these in the Norwegian Sea. It is noteworthy that despite the tremendous concern in the United States, the first Soviet submarines to be identified in the western Atlantic were the four conventionally powered, non-missile bearing Foxtrots during the Cuban Missile Crisis.

Growth of Soviet Air Reconnaissance

The Air Threat

(U) With the development of the submarine launched cruise missile, the Soviets also concentrated on expanding their long range reconnaissance air forces reaching into both the Atlantic and Pacific oceans. These aircraft were capable of providing missile targeting as well as reconnaissance information and included the Bison, Tu-20 Bear and, late in the period, the supersonic Tu-22 Blinder, as well as the shorter range Tu-16 Badger. All came in a number of versions, some capable of carrying standoff air-to-surface weapons.*

The CVS Counter

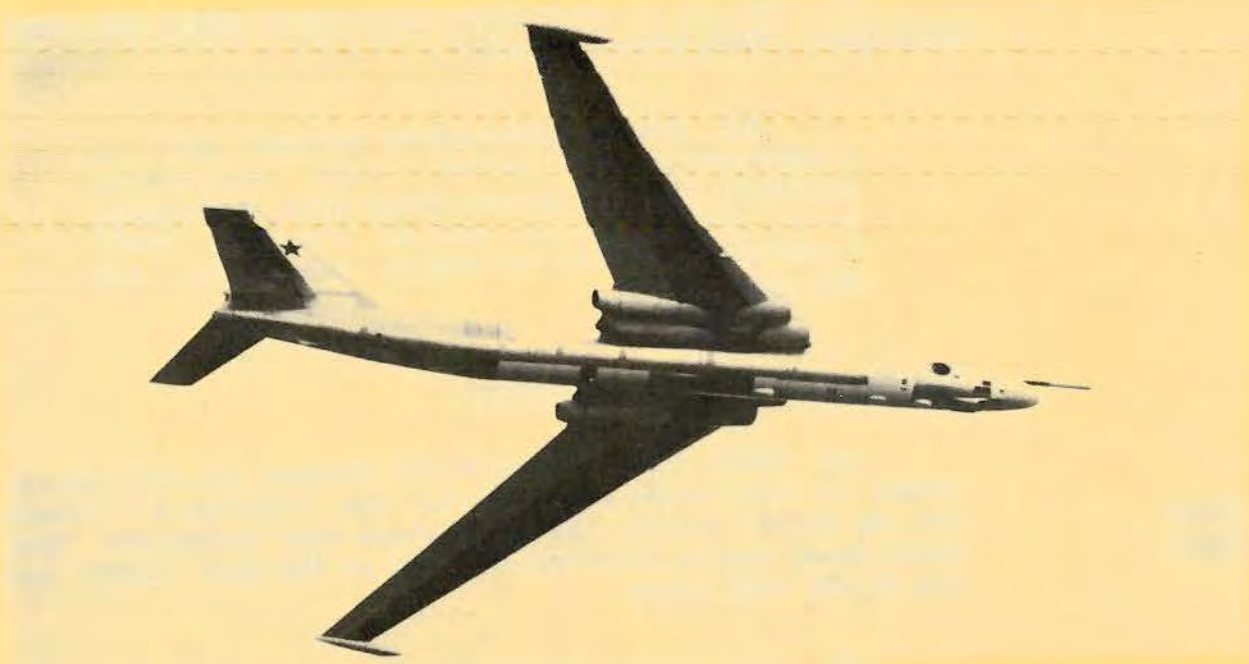
(U) By 1962-1963 Bears were operating regularly from the Northern Fleet areas, and Bisons were periodically intercepting U.S. carriers in the western Pacific. To counter this threat the air groups on the antisubmarine carriers were augmented by four A-4Bs from 1962 on, which were to act as interceptors. The limited performance of this obsolescent aircraft, the most capable the 27A carrier conversions could handle, led in 1964 to the two Fleet ASW commands recommending development of an updated interceptor compatible with the CVS 10 (27A) carriers. After considerable discussion of this problem in 1962 and 1963 ASWFORLANT and ASWFORPAC submitted a proposed TSOR for a CVS fighter to CNO in 1964. However, no such program ever developed.[5]

1964 CVS Fighter TSOR

(U The growing Soviet missile threat led to concern within the Navy regarding trends for the immediate future. As a result led Rear Admiral Horacio Rivero, Jr., then Director of the Long Range Objectives Group (Op-93) stated in August 1960, that: (U)

> (U) The best defense against the SLBM threat of the late sixties will be through deterrence by means of Polaris, and by development of a capability to: (a) detect and shadow a reasonable number of submarines entering a zone 1,000-1,500 miles from CONUS; (b) destroy shadowed submarines if necessary. Additionally, the Soviets must know we have this capability.[6]

* Such as the Kennel (AS-1), Kipper (AS-2), and Kangaroo (AS-3), all turbojet powered, transonic (except the AS-3, which was capable of Mach 2) with ranges up to 300 nautical miles.

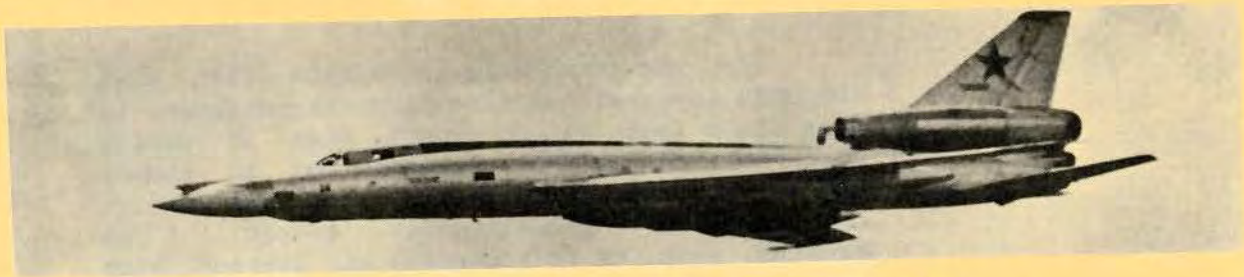


U.S. Navy

(U) A Bison B, Naval reconnaissance aircraft.

U.S. Navy

(U) A Tu-95 Bear--sometime airborne partner of the Echo and Juliette submarines.



U.S. Navy

(U) The Soviet Blinder-C, reconnaissance version. The Soviets' first naval aircraft of this type with supersonic dash capability.

(U) The key to containing this threat would be surveillance. RADM Rivero stated:

> (U) Future surveillance systems will be a combination of limited range shore-based equipment (SOSUS), picket ships with long-range sonar, patrol aircraft such as the P3V, small tracking units with helicopter capability, and HUK groups.[7]

The Navy's Surveillance Systems

SOSUS Grows

(U) SOSUS (Sound Surveillance System) was now operational in both oceans primarily in the continental waters off the United States. By 1961, there were twenty-one deep water Sound Search Stations, fifteen on the East Coast and six on the West Coast.

(U) Improvements to the overall SOSUS system which were contemplated at this time included installation of shallow water systems, additional deep water stations, and the use of airborne LOFAR equipment.

Progress in High Frequency Direction Finding

HFDF Nets

(U) In addition to SOSUS, the Navy also relied on its three HFDF nets, two in the Pacific and one in the Atlantic, to provide intelligence on the whereabouts and activities of the Soviet navy.

(U) This network was reminiscent of the systems successfully used during World War II. As Captain William H. Groverman reported in 1960: (U)

> (U) The reasonable assumption (is) that the USSR has profited from German experience in this field (and) we can expect them to employ sophisticated modes of communication to thwart not only our direction finding but our entire communication intelligence effort. The problem, then, is to modernize our current high frequency direction finding equipment to a point where, ultimately, we can detect and fix

transmissions as short as 1 millisecond in duration. . . .

(U) With optimum conditions, the time from original intercept at the control station to measurement of the bearing at the outstation is a minimum of 20 seconds. Thus, without previous knowledge of time and frequency, we would have no capability of determining the position of a transmitter which is on the air for less than that amount of time. This, of course, means that our capability against short or time-compressed signals is relatively nonexistent. . . .

(U) Our most active net, the WESTPAC, is currently handling about 200-250 "flashes" per day. They can fix about 40 percent of their targets with an average accuracy of about 100 nautical miles.

(U) Our two major problems, then, are:

HFDF Improvements

1. The improvement of speed and accuracy of current operations.

2. The development of a capability against extremely high-speed and/or short transmissions.[11]

(U) One of the new HFDF installations was placed at Okinawa in 1960 with fourteen more to follow during fiscal years 1961 through 1964.

The Antisubmarine Carrier Forces

(U) To take advantage of these intelligence sources which provided the alarm over vast stretches of ocean, the Navy required a long range air capability to conduct prompt investigation. This increasingly became long range land-based air--most notably the new long range, land-based P-3A aircraft--as well as the antisubmarine carrier groups. The latter were built around nine *Essex* class CVSs, five in the Atlantic and four in the Pacific, a force that remained

U.S. Navy

(U) USS Randolph *with an S2F-3 and WF-2 on deck.*

substantially constant during this four year period. Most of these ships, all of which had a nuclear ASW weapon capability, underwent FRAM II improvements during this time. *Randolph* (CVS 15) was first in FY 1961 when from October 1960 until March 1961 she received a bow-mounted 5-kHz

SQS-23 sonar, the Iconorama tactical display system in CIC, new ECM, and the BELLHOP electronic data link equipment. COMASWGRU ALFA 1961 tests of these improvements were encouraging: (U)

Carrier FRAM II Improvements

(U) If the carrier is operating in the 18-22 knot range, using evasive steering . . . there is every indication that (it) has a high probability of detecting the submarine at sufficient range to preclude a successful attack with quiet (and relatively slow) torpedoes. Fast (and noisy) torpedoes fired at extreme ranges will probably be detected at sufficient range to permit the ship to evade.[12]

(U) The temperamental Iconorama projection system was basically a large screen tactical ASW display. The 1961 TG ALFA report concluded, ". . . Maintenance problems have prevented the frequent use of this system for ASW displays; however, its real potential is recognized."[13] The ART-28 BELLHOP data link in the WF-2 (E-1B) proved highly reliable, thus providing *Randolph* via its new WRR-1 terminal equipment with excellent radar situation displays generated by the APS-82 radar in the aircraft.[14]

ASCAC Arrives

(U) The antisubmarine classification and analysis center, ASCAC, initially a Pacific Fleet concept, approved for evaluation in *Yorktown* (CVS 10) and *Bennington* (CVS 20) in 1961, was developed during the early sixties in order to make maximum use of scarce specialized equipment and highly qualified personnel at a central location aboard the carrierin analyzing raw data. As reported by COMASWFORPAC, "Raw passive and active acoustic information, which cannot be positively resolved by the airborne operator, is relayed to ASCAC via HEIFER and/or multichannel JEZEBEL relay, and is processed . . . and analyzed with reference to known submarine signals and other ASW intelligence to provide a classification assistance to the on-scene operator."[15]

(U) The initial systems were homemade kits minus HEIFER* and Multi-Channel Relay, each CVS installation being unique and suffering from a number of problems as a result. However, in November 1964 the CNO approved four system engineered sets, two for each Fleet. These were officially designated Interim ASCACs and were to go into one CVS and one shore base on each coast with installation to be completed by January 1966. On the Atlantic coast the carrier selected was *Randolph* (CVS 15), which received the new

* Wide band UHF channel used to transfer single channel LOFAR information.

design during her August 1964 to March 1965 overhaul. She had been working with an earlier version since December 1963. One ASCAC limitation in the older systems was the difficulty in transmitting VLF LOFAR signals through ordinary voice radios. In the improved ASCAC a subcarrier modulator was installed which was compatible with the HEIFER unit. Other multichannel improvements were designed to allow the CVS to monitor four VS aircraft simultaneously.

Ten CVS

(U) Ultimately, eight of the *Essex* class, seven 27As and one 27C, received this final major ASW FRAM II conversion. Listed in order by the fiscal year when these conversions were carried out, these *Essex* class carriers were:

FY	Carrier	Basic Conversion	Fleet
1961	*Randolph* (CVS 15)	27A	Atlantic
1962	*Essex* (CVS 9)	27A	Atlantic
1962	*Kearsarge* (CVS 33)	27A	Pacific
1963	*Bennington* (CVS 20)	27A	Pacific
1964	*Wasp* (CVS 18)	27A	Atlantic
1965	*Intrepid* (CVS 11)	27C	Atlantic
1965	*Hornet* (CVS 12)	27A	Pacific
1966	*Yorktown* (CVS 10)	27A	Pacific

(U) In addition, two other *Essex* class ships served during this period with CVS designations. These were *Lake Champlain* (CVS 39) and *Antietam* (CVS 36), the former a "straight deck" 27A never converted, and the latter an unconverted basic *Essex* with the Navy's first experimental angled deck. Both were in the Atlantic Fleet.

ASW Command and Control

(U) Chapter IV, Volume I briefly summarizes the initial Navy interest in ASW command and control, based on the early NTDS development aimed primarily at task force air defense. By 1964 this technology had advanced to the point where COMASWFORPAC was moved to say:

> (U) In view of data processing technology, it appears that an ASW TDS digital computer system which acts on processed information from all sensor inputs in the force, displays this data for command decision and, on command, automatically transmits data or decisions as orders at a high rate, is required to meet the increasingly complex and demanding problem of ASW Tactical Command.[16]

U.S. Navy

(U) USS Wasp (CVS 18) with S2F-3 and HSS-1 helicopters. She was to receive the digital ASWSCCS system in the mid-sixties.

ASW TDS

(U) As a result of a joint fleet conference on ASW tactical data systems, the CNO on 8 October 1964 directed BuShips to establish a new Engineering Development project to develop an ASW Ship Command and Control System (ASWSCCS).[17] There would be three prototype afloat systems, the most capable in a CVS (*Wasp*, CVS 18), with two lesser installations in two new construction DEs (VOGE (DE 1047) and KOELSCH (DE 1049)). This program was under the technical direction of the Naval Electronics Laboratory, San Diego, which would set up the land-based prototype and develop the necessary software. The hardware would consist of modified NTDS components.

Carrier-Based ASW

(U) The air complement of each CVS included two ten plane S2F squadrons, one sixteen plane HSS squadron and a detachment of early warning AD-5W or WF-2* aircraft. In

* Which in 1962 became the EA-1E and E-1B respectively.

1961, this amounted to ten operational S2F squadrons in the Atlantic and eight in the Pacific; ASW helicopter squadrons totaled five in the Atlantic and four in the Pacific. In addition, each fleet had one S2F and one HSS training squadron, for a grand operational total of 200 S2F and 160 HSS aircraft.

The S2F-3

(U) The backbone of this force continued to be the S2F, the design being refined as weapons changed and new sensor systems were developed. During this period the new and larger S2F-3* was introduced. With it the Navy for the first time had a carrier-based aircraft capable of carrying both the JULIE and JEZEBEL sonobuoy detection systems, along with the new ARR-58 sonobouy receiver, the improved ASQ-10 MAD equipment, ASR-3 exhaust trail detector, and the APS-88 radar.** Fleet introduction of the S2F-3 began in September 1960, and was essentially complete in both Fleets by 1964. The S2F-3 thus gave the HUK group the ability to localize, classify, and destroy fully submerged submarines on the basis of SOSUS information, an ability--short of destruction--that was to be tested off Cuba in 1962. As COMOPDEVFOR reported in 1961, "The S2F-3 weapons system provides the capability for successful search, localization and attack of an evasive modern submarine."[18] Two squadrons became operational in the Atlantic during FY 61 on *Randolph* (CVS 15) although their initial operations were hampered by a shortage of JEZEBEL sonobuoys and safe JULIE PDCs. These two squadrons, however, provided the Atlantic Fleet ASW carrier force with its first JEZEBEL capability.[19] Four years later all ten Atlantic squadrons had been reequipped. In the Pacific, however, only six of the eight VS squadrons had received their S-2D/E aircraft by 1964.

(U While the S-2E represented a significant advance in carrier aircraft ASW performance, ASWFORPAC by 1964 had a better idea: (U)

* Which became the S-2D with the Navy-wide aircraft designation changes in 1962. At the same time the HSS-2 became the SH-3A.

** At 26,200 pounds gross weight the S2F-3 was 18 inches longer (43 feet 6 inches) and had three feet more wing span (72 feet 7 inches) than the earlier Tracker versions. Endurance was increased to nearly 8 hours, a 40 percent improvement over the S2F-2. The latter's lower fuselage bulge, incorporated to allow the Mk 90 Betty to be carried internally, was eliminated in this newest version since the smaller Mk 101 Lulu could be stowed within the original aircraft fuselage lines.

The CVS Years

U.S. Navy

(U) An S2F-3 (S-2E) looking for submarines with her improved APS-88 radar and ASQ-10 MAD extended.

U.S. Navy

(U) An SH-3A of HS 7 with its AQS-10 dipping sonar at the ready, 22 March 1963.

U.S. Navy

(U) An E-1B (WF-2) aboard Constellation *(CVA 64), one of the attack carriers.*

A New ASW Aircraft Requirement

(U) The advent of the nuclear powered and missile firing submarines of the Soviets as well as their predicted increase in numbers and performance . . . have rendered our current carrier-based ASW aircraft, particularly the S-2 aircraft, obsolescent. These submarines have the capability of accurately attacking our surface forces with conventional or nuclear armed missiles beyond the range that we can conduct either searches or attacks against these submarines. . . . In November 1964, a Proposed Tentative Specific Operational Requirement (TSOR) for a follow-on aircraft for the S-2 was forwarded to CNO by CINCPACFLT and COMASWFORPAC which defines the capabilities that are required if we are to counter this Soviet threat. This aircraft has been designated VS(X). It must be developed as expeditiously as possible.[20]

(U) CINCLANT agreed: "Development of a follow-on VS aircraft to replace the operationally limited, overcrowded S-2 is a requirement of increasing urgency."[21] The momentum for the forthcoming VSX program was growing.

The SH-3A Arrives...

...With Its AQS-10 Sonar

(U) The HSS-2 (SH-3A)* also made its appearance during this period with fleet introduction in April 1961 and the Pacific Fleet HS squadrons being completely equipped by mid-1964. While the HSS series carried the AQS-4 (HSS-1) and AQS-5 (HSS-1N) dipping sonars, the SH-3A carried the newer AQS-10.** CINCLANT in FY 64 recommended that the SH-3A's sensors be augmented by installation of MAD, while at about the same time TG ALFA explored the concept of using JEZEBEL aboard the SH-3A with mixed results.

AD-5W Out E-1B In

(U) During this four year period, the venerable AD-5W gradually was replaced in the carrier fleet by the Grumman WF-2 (E-1B) with its APS-82 radar mounted in a

* It was propelled by twin T-58 gas turbines, grossed 16,240 pounds (an increase of 4,250 pounds over the HSS-1), and had an endurance of four hours.

** The primary difference between the AQS-4 and AQS-5 was sonar cable length, this being 90 and 200 feet, respectively. The AQS-10 also had 200 feet of cable but operated at lower frequencies (9.25, 10.0 and 10.75 kHz versus 20, 21 and 22 kHz) b(1)

massive fixed radome over the fuselage. Thus, after nearly twenty years the APS-20 series of radars was finally on its way out, a more capable system having made the scene. Initial tests by TG ALFA in 1961 indicated a 50 percent improvement in detection range on periscopes and snorkels for the APS-82 over the APS-20B.

Carrier-Based ASW Weapons and Sensors

(U) All of these carrier aircraft were capable of carrying the Mk 43, Mk 44 and Mk 46 torpedoes, the last starting delayed fleet delivery in limited quantities in 1965. In addition, there were the Mk 101 (Lulu) and TX-57 nuclear depth charges. The latter, a new development, was particularly attractive since it was one third the size of Lulu. The S2F also could carry the Mk 54-1 conventional depth charge which contained a 248 pound HBX warhead.

Torpedoes, Etc.

(U) Most of the newer weapons systems, the torpedoes in particular, were in short supply during this entire period, as both Fleet Commanders periodically reported. In 1961 in the Atlantic Fleet, for example, as summarized by CINCLANT:

Weapons Shortages

> (U) . . . The ASW weapons situation remains unsatisfactory and is the most critical single deficiency in ASW readiness. The worst situation exists in the area of ASW torpedoes. Torpedoes are common to all ASW vehicles and are our primary ASW weapons. It is estimated that current stocks of ASW weapons would be completely exhausted in less than two months of an all-out ASW war. Stocks of more modern weapons would probably be exhausted in less than two weeks.[22]

(U) Sonobuoys, while effective when operating properly, were also in short supply during this period and their reliability was poor. Those in use included the SSQ-26 and SSQ-23 used for JULIE search and localization respectively, along with large quantities of PDCs (Practice Depth Charges). The 18 pound SSQ-23 and 20 pound SSQ-28 were both employed in JEZEBEL search and localization. These systems showed promises and limitations as reported by CINCLANT in 1963:

Sonobuoys

> (U) (Fleet) capability has continued to improve with the receipt of more JEZEBEL

equipped aircraft and helicopters with longer range sonar. Considerable improvement in the tactical use of JEZEBEL was realized during the past year. Operational exercises with this equipment has shown the significant part that LOFAR/CODAR can play in ASW. Unfortunately, since our present JEZEBEL buoys operate for only two or three hours, they must be replaced several times in a pattern before a submarine has to expose itself to detection. A longer life JEZEBEL buoy (8 to 24 hours) would provide an economical way to further the tactical development and operational use of JEZEBEL.[23]

Sonobuoy Limitations

(U) These new sensors and their platforms moved CINCLANTFLT to report that in FY 1962: (U)

Fleet Progress

(U) The ASW readiness of the Atlantic Fleet air forces has improved somewhat due to the introduction of new equipment and aircraft in the force. Forty-nine (JEZEBEL equipped) S2F-3s and thirty-seven HSS-2s have been received, providing the ASW carrier groups with a greatly improved capability. . . .

(U . . . About 35 percent of the LANTFLT ASW helicopters are the new HSS-2 with an active dipping sonar that has a 5,000 yard detection range under good water conditions. Detection of snorkels and periscopes in anything but very low sea states is still a problem. A light weight radar with a good capability in high sea states is urgently needed.[24]

FRAM Destroyer Progress

(U) A pressing problem that plagued the operational forces during the early sixties was the absence of a long-range weapons delivery system that could match the capability of the new far-reaching SQS-23 and SQS-26 sonar systems going into the new and modified destroyers. The FRAM I and II destroyer conversions were scheduled to receive DASH, the Drone Antisubmarine Helicopter. This system was also planned as an integral component of the proposed DDK (Sea Hawk) program, the new destroyer for the seventies then in the process of technical development by the Navy laboratories. However, the airborne component of the destroyer DASH system, the DSN-1 unmanned helicopter, continued to

DASH Delays

The CVS Years

(U) USS John W. Thomason *(DD 760) with her full FRAM II conversion. Note the open DASH hangar and stern VDS gear.*

(U) The USS Joseph P. Kennedy *(DD 850), a FRAM I, with a QH-50 DASH on deck.*

DASH Fleet Introduction

encounter developmental problems resulting in an extended delay in its reaching operational status with the fleet. LANTFLT estimated in 1961 that as a result DASH procurement would provide less than 25 percent of ship requirements by FY 1964.[25] No drones were expected before 1963 although there were twelve DASH-capable ships in 1961. By the end of FY 64 the Atlantic Fleet had, in fact, eighty-eight ships modified for DASH, of which seventy had platforms only. *Ault* (DD 698) was the first DASH equipped destroyer to deploy in the Atlantic Fleet, going to the SIXTH Fleet for five months in July 1963. In the Pacific, by 1964 there were fifty-five destroyers which had undergone FRAM conversion. PACFLT, however, reported a more sophisticated problem:

> (U) Although the number of DASH-capable ships has increased over the past year, logistic support for the DASH/Mk 57 bomb is not yet adequate to provide the desired degree of readiness for this system.[26]

(U) A year later, PACFLT reported that twenty-four of its destroyers had completed DASH systems qualification test (SQT) with this figure expected to rise to forty-two by February 1966. Operational experience had shown that while multiple DASH operations appeared feasible, frequency interface problems "did not permit such operations." A shift in frequency range was expected to overcome this.

(U) The Navy's problems with the DASH system were heightened by the Berlin crisis of mid-1961. At this point the long range ASW weapons delivery systems were far from complete, and thus not effective if required.* To overcome this problem RADM Mustin (Op-001) suggested an interim manned system based on one of the small commercial helicopters in the 3,000 pound gross weight range then available.[51] Vice Admiral R.B. Pirie, DCNO, Air (Op-05), took strong exception to this approach as an unnecessary expense which would use additional moneys to the detriment of other high priority programs.[27] VADM Pirie did, however, endorse consideration of a light manned helicopter as a permanent replacement for the trouble-laden DSN-3 and recommended that the study be pursued on that basis. Thus the manned

Manned Aircraft for the DASH Mission

* While the first piloted test DSN-3 flew in April 1961, by Admiral Mustin's estimates, in December 1961 there would be forty-one DASH-capable ships in the active fleet, but no operationally available DSN-3s. By mid-1964 these figures would rise to 128 DASH-capable ships with only 50 operating unmanned helicopters.

helicopter concept for destroyer applications which would eventually lead to the LAMPS program was beginning to stir. In 1962, however, the Navy grimly continued with the program to which it was already heavily committed.

A New SOR for The QH-50C

(U) The delayed development of DASH resulted in a revised SOR (Specific Operational Requirement) for an improved unmanned vehicle, the DSN-3 (QH-50C), issued on 22 August 1962. This specified that the revised design was to be capable of operating in all helicopter compatible weather conditions and that four ships in company should be able to conduct DASH operations concurrently. In addition, it would have an endurance of 60 minutes, an operating radius of 30 nautical miles and a cruising speed of 80 knots. Most importantly, it would carry two Mk 44 or one Mk 46 torpedo out to 10,000 yards and release it within 200 yards of the target.[28] The QH-50C which met these requirements finally reached the fleet in November 1962. It was to be followed in late 1965 by the QH-50D with 90 minutes endurance and an increased payload sufficient to allow two Mk 46-1 torpedoes to be carried.

CVS Operational Roles

(U) Operationally, the CVS-oriented task groups had grown into three major roles as outlined by CAPT Groverman, ASW R&D Programs (Op-71C) in March 1960. These were:

The CVS Missions

1. Protection of the United States against submarine launched ballistic missiles--a problem of large area surveillance.

2. Protection of the fast carrier task force--a problem of search rate in transit.

3. Protection of shipping--a problem of force levels and technology.[29]

(U) The second role, protecting the fast carrier task force, was receiving increasing emphasis as VPs settled into the SOSUS investigation requirement while the CVS required the air protection the CVAs could provide. CAPT Groverman stated that there were two extremes to consider: (U)

> (U) At one end, the force will be making a high speed sustained run into a single launch point remaining only long enough to recover her

CVS Protecting the Task Force

aircraft and then run out. At the other end, we have the force operating for quite some time in an area 100 miles or so square which requires sterilization of the area of enemy subs and maintenance of this condition. If these two extremes can be covered, those that would fall in between, most certainly would create no requirement in the way of additional forces or equipments. . . .

CAPT Groverman's Assessment

(U) The threat then, from (1960) until about 1963, will be a great number of snorkel submarines with the enemy achieving a nuclear submarine capability toward the end of the era. The snorkle submarines will be equipped with conventional torpedoes, while the nuclear submarines must be credited with a capability similar to our Subroc missile.

(U) While the snorkling submarine is a formidable foe, he is not an impossible problem with our present and immediate future equipment. . . . However, when consideration is given to (the nuclear submarine) with a Subroc type weapon, a new defense requirement is created. He now has the capability to stand off at a distance of some 35 miles and fire a high yield weapon. This puts him well outside the range of the search equipment available to the ASW ships in the carrier force. He can fire from a submerged position thereby complicating the problem from an air search standpoint. . . .

(U) All the sonic devices, that presently and for the foreseeable future represent our best capability to detect, are speed limited to the self-noise generated by this speed. The longer ranges expected in new equipment will alleviate this somewhat. Also, the capability to kill at the ranges we expect to acquire with the new equipments is not inherently a part of the system, and must be provided by another unit. This in almost every case will be an aircraft. . . .

(U) Where once we could forge a ring of destroyers immediately around a carrier task

Changes in ASW TF Defense

force, rely heavily on speed and depend on air search to deny the submarine necessary intelligence by forcing him down, we find ourselves entering a contest where we can be located at nearly 100 miles, identified with some accuracy, stalked at our own speed if he so desires, and attacked from a position well outside the acquisition capability of our . . . (sensors with) a weapon that can severely cripple our whole force unless we spread it out. . . .

(U) (Therefore our) forces will, of tactical necessity, occupy a position that must cover the ocean from the center of the force to a circle, the radius of which is 35 miles with the indication in the immediate future that this radius will be increased to 75 miles.

(U With the screening speed capability of the helicopter above the sustained speed of the force and with a promise of effective performance of the destroyer sonar at over 25 knots, we have covered the van area. The flank and stern coverage must approach the adequacy of the van coverage. Airborne JEZEBEL equipment will augment intelligence from these directions along with an active attack capability in the airborne JULIE equipment. This will reduce the requirement for solid coverage by destroyers and helicopters in these areas.

HUK Group Requirements

(U) Today, we must decide the number of HUK/CVS groups necessary to provide adequate protection for the attack carrier groups that will be at sea. This number will be in addition to other HUK requirements. In fact, the coverage required is so great that it can be provided only by a unit devoting itself entirely to this singular task. This coverage can be provided only by a team composed essentially as the present HUK group. These forces may well be an integral part of the fast carrier task force or they may operate independently.[30]

(U) This presentation in effect made a strong plea at the Secretary of the Navy level for the Hunter-Killer

carrier group whose specialists would be totally devoted to protection of the fast carrier task force. In addition, there was a growing shortage of numbers as all these responsibilities increased. Vice Admiral John S. Thach, in 1960 as COMASWFORPAC, expressed a similar concern regarding the CVS' surveillance role.

Admiral Thach to SecNav

> (U) One of the greatest fears of people in the Fleet is the dwindling numbers of ships and aircraft. Although the combination of the various surveillance systems being considered should make it possible to do the job it must be kept in mind that these are "burglar alarms" only. An adequate number of Hunter-Killer groups will still be needed to answer alarms, localize, classify, track and kill if necessary. I have seen a number of analytical studies of the forces required in ASW and in none of them are the minimum requirements for numbers of Hunter-Killer Groups as low as our current inventory.[31]

(U) More generally, in the protection of shipping, the third role for which the ASW carriers would be responsible, RADM Mustin (ASW Executive (Op-001)) said in March 1961:

> (U) A submarine ship-sinking campaign could cut our throats, militarily or economically or both, in limited war or in general war, unless we have the antisubmarine capability to defeat it. We should remember this carefully, and not become preoccupied with the limited probabilities connected with Soviet missile submarines, at the expense of forgetting everything else.[32]

(U) Congress, unfortunately, was much more concerned during this period with the submarine missile threat. This preoccupation was summarized by Navy Secretary William B. Franke in 1960:

The Congressional Preoccupation

> (U) . . . The Congress, when discussing ASW, has gotten into the frame of mind that ASW means the defense of the coastline of the United States. They think only of ballistic missiles and submarines firing them, forgetting about defense of shipping and other important aspects.[33]

Adequacy of the Navy's ASW Forces

(U) The Navy equated the growing dimensions of the threat and its ability to deal with it to the age and inadequacy of ASW forces available to meet these responsibilites. In a report dated 20 May 1961, Secretary of the Navy John B. Connally summarized these estimations of U.S. ASW capability for the new Secretary of Defense, Robert S. McNamara:* "(ASW) capabilities are estimated to be adequate now, inadequate in 1966, and still less adequate in 1971 under present funding levels."[34]

The Cuban Missile Crisis

Fall 1962

(U) Independent of this concern over inadequate ASW forces, ordnance, and sensors, the Cuban crisis arose during October and November of 1962. As the main operational focal point of this period, it was the first serious opportunity to exercise against potentially hostile submarines since World War II.

Soviet Offensive Weapons in Cuba

(U) The U.S. had monitored with mounting concern the rapid growth of Soviet supplied defensive armament to Cuba during 1962. By October, this concern deepened as the first Soviet built Il-28 Beagle medium range bombers, capable of offensive strikes against the United States, were detected on Cuban airfields. By mid-October, aerial reconnissance confirmed construction of two four-missile IRBM sites which when activated would be able to reach the entire continental United States. As a result, President Kennedy declared a quarantine effective 24 October until the Soviet Union removed the missiles. CINCLANT in OpOrd 45-62 designated COMSECONDFLT Quarantine Force Commander (CTF 136). COMASWFORLANT as CTF 81-83 was directed to conduct air surveillance as requested by CTF 136. Initially within CTF 136, CTG 136.2, consisting of one CVS** and four destroyers, operated behind a 500 mile arc maintained by CTG 136.1. These forces were designed to intercept all surface traffic moving in and out of Cuba. CINCLANTFLT subsequently provided a confidential summary of this effort:

CTF 136 Formed

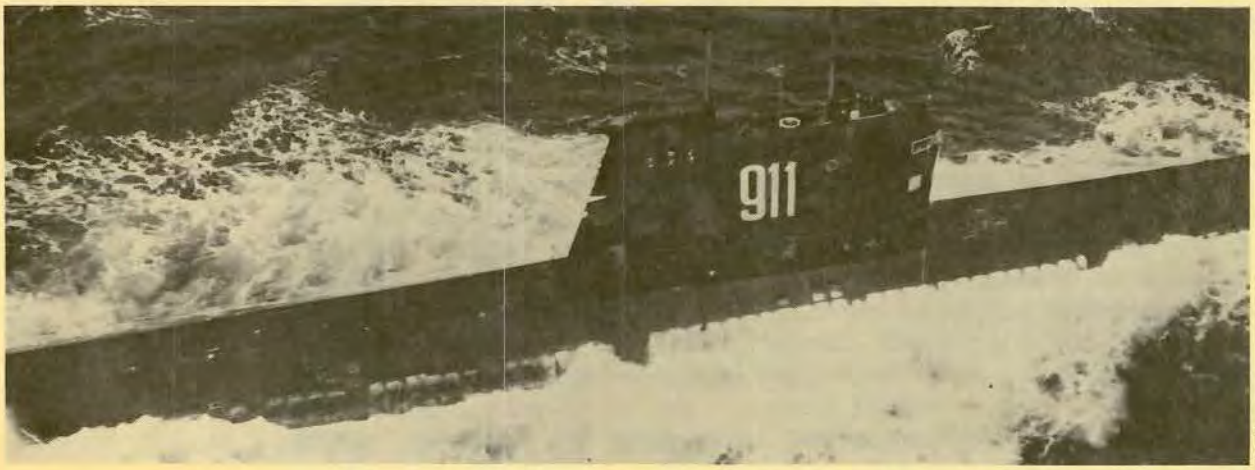
> (U) The search effort in an operation such as this one was a monumental task. An average of about 56 ships, 240 aircraft and

* Secretary of Defense from 21 January 1961 to 1 March 1968.

** The CVS Air Group consisted of twenty-two S2F, fourteen HSS-2, and one WF-2.

U.S. Navy

(U) A Soviet Foxtrot with an HSS-1 overhead, 9 November 1962.



U.S. Navy

(U) Foxtrot 911, Contact C-26, forced to the surface after 35 hours of continuous sonar contact. In a typical Soviet ruse, the pennant number 011 appeared on the opposite side of the sail.

U.S. Navy

(U) A Foxtrot flying the Red Star ensign. Photographed by U.S. Naval aircraft in the vicinity of Cuban quarantine operations.

CINCLANT Reports

some 30,000 personnel were directly engaged in the effort to locate ships inbound for, and later outbound from Cuba. Naval Air Patrol Squadrons and Antisubmarine Warfare Forces Atlantic Fleet provided aircraft to search the ocean approaches to Cuba. At the outset of the quarantine, the U.S. Air Force provided six RB-47 aircraft and four RB-50 aircraft to augment and extend Navy search efforts. The six RB-47 aircraft were withdrawn from the effort after about one week of search operations. The Air Force retained the four RB-50 aircraft in quarantine operations on a continuing basis to operate out of the Azores and make daily searches of the Ocean Area out to 400 miles south of the Azores. To search the approximately 4,500,000 square miles of ocean in support of the over-all quarantine operation, the Navy flew aircraft from such widely separated points as Roosevelt Roads, Puerto Rico; Guantanamo Bay; Bermuda; the Azores; Argentia, Newfoundland; Jacksonville; Key West; Norfolk; and Patuxent River. Aircraft searches accounted for the identification of over 200 ships of interest to quarantine operations control. By way of contrast, surface ships intercepted only 50 ships of interest. The majority of ships were intercepted by aircraft, then evaluated. Once it was determined the ship was of interest, a surface unit was vectored to intercept.[35]

(U) CINCLANT Fleet divided the Cuban quarantine operation into three phases:

1. Phase I, running from 24 October to 4 November. This saw many Soviet ships proceeding to Cuba turn back without entering the quarantine area.

The Soviets Remove Their Missiles...

2. Phase II, from 5 to 11 November. During this period eleven ships qualifying for special attention were observed outbound from Cuba. Among these were nine that the Soviet delegation had identified to the State Department as being those carrying the IRBMs out ot Cuba. Provided were ship names, numbers of missiles, and dates of departure from Cuba. This was in conformance with the agreement reached by the United States and the Soviet Union which specified removal of all strategic weapons systems.